

AMENDMENTS TO THE CLAIMS

Claims 1-2 (canceled)

Claim 3 (currently amended) ~~The A tuning method of claim 2 further comprising:~~

- (a) mixing a channel of interest from a channelized spectrum having a predetermined channel spacing with a first local oscillator signal;
- (b) mixing the channel of interest with a second local oscillator signal having the first frequency and being approximately in quadrature with the first local oscillator signal;
- (b) (c) wherein the first local oscillator signal has a first frequency that is (1) one-half of a channel spacing displaced from an integer multiple of the channel spacing, and (2) selected to frequency translate the channel of interest to within a passband whose lower edge is spaced from DC by about the channel spacing and whose width is about the channel spacing;
- (d) the channel of interest has a predetermined maximum bandwidth less than the channel spacing;
- (e) the channel of interest lies within one of an upper high frequency spectrum of interest and a lower high frequency spectrum of interest; and
- (e) (f) the method further comprises providing spectrum coverage within one of the high frequency spectra of interest and not the other.

Claim 4 (original) The method of claim 3 further comprising coarse-tuning the local oscillator signal by one local oscillator step from the first frequency to a second frequency an integral number of channel spacings from the first frequency.

Claims 5-6 (canceled)

Claim 7 (currently amended) ~~The A tuning method of claim 1 further comprising:~~

(a) mixing a channel of interest from a channelized spectrum having a predetermined channel spacing with a first local oscillator signal;

(b) mixing the channel of interest with a second local oscillator signal having the first frequency and being approximately in quadrature with the first local oscillator signal;

(c) wherein the first local oscillator signal has a first frequency that is (1) one-half of a channel spacing displaced from an integer multiple of the channel spacing, and (2) selected to frequency translate the channel of interest to within a passband whose lower edge is spaced from DC by about the channel spacing and whose width is about the channel spacing.

Claims 8-9 (canceled)

Claim 10 (currently amended) ~~The A tuning method of claim 1 wherein comprising:~~

(a) mixing a channel of interest from a channelized spectrum having a predetermined channel spacing with a first local oscillator signal;

(b) wherein the first local oscillator signal has a first frequency that is (1) one-half of a channel spacing displaced from an integer multiple of the channel spacing, and (2) selected to frequency translate the channel of interest to within a passband whose lower edge is spaced from DC by about the channel spacing and whose width is about the channel spacing;

(c) the channel of interest lies within one of an upper high frequency spectrum of interest and a lower high frequency spectrum of interest; and

(d) the method further comprises providing spectrum coverage within one of the high frequency spectra of interest and not the other.

Claim 11 (original) The method of claim 10 further comprising switching between:

(a) providing spectrum coverage within the lower high frequency spectrum of interest and not the upper high frequency spectrum of interest; and

(b) providing spectrum coverage within the upper high frequency spectrum of interest and not the lower high frequency spectrum of interest.

Claims 12-13 (canceled)

Claim 14 (currently amended) ~~The A[al]apparatus of claim 13 for tuning, from a channelized spectrum having a predetermined channel spacing, a channel of interest, the apparatus further comprising:~~

- (a) a local oscillator configured to generate a local oscillator signal at a first frequency that is one-half of the channel spacing displaced from an integer multiple of the channel spacing; and
- (b) a mixer responsive to the local oscillator signal and the channel of interest, wherein the mixer frequency translates the channel of interest;
- (c) a second local oscillator configured to generate a second local oscillator signal having the first frequency and being approximately in quadrature with the first local oscillator signal; and
- (d) a second mixer responsive to the second local oscillator signal and the channel of interest, wherein[:] (1) the channel of interest lies within one of an upper high frequency spectrum of interest and a lower high frequency spectrum of interest[;], and (2) the apparatus provides spectrum coverage within one of the high frequency spectra of interest and not the other;
- (e) the frequency-translated channel of interest falls within a passband that is about a channel spacing wide and that is spaced from DC by a frequency offset of about the channel spacing; and

(f) the channel of interest has a predetermined maximum bandwidth less than the channel spacing.

Claims 15-16 (canceled)

Claim 17 (currently amended) The A[a]pparatus of claim 12 for tuning, from a channelized spectrum having a predetermined channel spacing, a channel of interest, the apparatus further comprising:

- (a) a local oscillator configured to generate a local oscillator signal at a first frequency that is one-half of the channel spacing displaced from an integer multiple of the channel spacing;
- (b) a mixer responsive to the local oscillator signal and the channel of interest, wherein the mixer frequency translates the channel of interest; and
- (c) a second local oscillator configured to generate a second local oscillator signal having the first frequency and being approximately in quadrature with the first local oscillator signal;
- (d) wherein the frequency-translated channel of interest falls within a passband that is about a channel spacing wide and that is spaced from DC by a frequency offset of about the channel spacing.

Claim 18 (previously presented) The apparatus of claim 17 further comprising a second mixer responsive to the second local oscillator signal and the channel of interest, wherein:

- (a) the channel of interest lies within one of an upper high frequency spectrum of interest and a lower high frequency spectrum of interest; and
- (b) the apparatus provides spectrum coverage within one of the high frequency spectra of interest and not the other.

Claim 19 (previously presented) Apparatus for tuning, from a channelized spectrum having a predetermined channel spacing, a channel of interest, the apparatus comprising:

- (a) a local oscillator configured to generate a first local oscillator signal at a first frequency that is an integer multiple of the channel spacing and a second local oscillator signal having the first frequency and being approximately in quadrature with the first local oscillator signal; and
- (b) a pair of mixers, each responsive to (1) a respective one of the local oscillator signals and (2) the channel of interest, wherein the mixers frequency translate the channel of interest;
- (c) wherein the frequency-translated channel of interest falls within a near-baseband passband spaced from DC by a frequency offset of at least about the channel spacing.

Claim 20 (previously presented) The apparatus of claim 19 wherein the spacing of the lower edge of the near-baseband passband from DC is greater than the channel spacing.

Claim 21 (original) The apparatus of claim 20 wherein the spacing of the lower edge of the near-baseband passband from DC is about twice the channel spacing.

Claim 22 (previously presented) The apparatus of claim 19 wherein:

- (a) the channel of interest lies within one of an upper high frequency spectrum of interest and a lower high frequency spectrum of interest; and
- (b) the apparatus provides spectrum coverage within one of the high frequency spectra of interest and not the other.

Claim 23 (previously presented) A method for tuning a channelized signal of interest from within a channelized spectrum, the method comprising:

- (a) splitting an incoming signal into two signal paths;
- (b) generating an approximately quadrature local oscillator signal from a local oscillator that is coarse-tunable across the channelized spectrum with a step size that is an integer multiple of the channel spacing;
- (c) quadrature mixing the split incoming signal with the local oscillator signal, thereby:

(1) frequency translating to a near-baseband passband an upper high frequency spectrum of interest from above the frequency of the local oscillator signal and a lower high frequency spectrum of interest from below the frequency of the local oscillator signal, the near-baseband passband being spaced from DC by at least about the channel spacing; and

(2) producing I and Q signals in approximate quadrature relation;

(d) limiting the frequency spectrum of the I and Q signals, wherein spectrum coverage is provided of a selected one of the high frequency spectra of interest and analog processing of signals at or close to DC is avoided; and

(e) repeating (a) through (d) in turn for a plurality of local oscillator frequencies, wherein high frequency spectra of interest tunable with the local oscillator frequencies of the plurality are interspersed among local oscillator frequencies of the plurality within the channelized spectrum.

Claim 24 (canceled)

Claim 25 (previously presented) The method of claim 23 wherein the near-baseband passband is sized to fit one channel spacing.

Claim 26 (previously presented) The method of claim 23 further comprising providing spectrum coverage within one of the high frequency spectra of interest and not the other.

Claim 27 (previously presented) The method of claim 23 wherein the spacing of the lower edge of the near-baseband passband from DC is greater than the channel spacing.

Claim 28 (previously presented) The method of claim 27 wherein the spacing of the lower edge of the near-baseband passband from DC is about twice the channel spacing.

Claim 29 (original) The method of claim 23 wherein limiting the frequency spectrum of the I and Q signals comprises filtering the signals in continuous-time using switched-capacitor circuitry.

Claim 30 (previously presented) The method of claim 23 wherein the near-baseband passband is defined with reference to a lower frequency F1 and an upper frequency F2, wherein F1=F2-F1 and F2-F1 is about an integer multiple of channel spacings.

Claims 31-32 (canceled)

Claim 33 (original) The method of claim 23 wherein limiting the frequency spectrum of the I and Q signals comprises highpass and lowpass filtering the signals in continuous-time.

Claim 34 (original) The method of claim 33 wherein limiting the frequency spectrum of the I and Q signals comprises filtering the signals in continuous-time using switched-capacitor circuitry.

Claim 35 (original) The method of claim 33 wherein limiting the frequency spectrum of the I and Q signals further comprises filtering the signals in discrete-time.

Claim 36 (original) The method of claim 23 further comprising providing spectrum coverage within one of the high frequency spectra of interest and not the other.

Claim 37 (original) The method of claim 36 further comprising:

- (a) converting the I and Q signals to digital I and Q signals; and
- (b) combining the digital I and Q signals to reject an undesired mixing image.

Claim 38 (original) The method of claim 37 further comprising correcting amplitude and phase errors between the digital I and Q signals.

Claim 39 (currently amended) Apparatus for tuning a channelized signal of interest from within a channelized spectrum having a predetermined channel spacing, the apparatus comprising:

- (a) an RF amplifier responsive to an incoming signal;
- (b) a local oscillator that is coarse-tunable across the channelized spectrum with a step size that is an integer multiple of the channel spacing to a plurality of local oscillator frequencies;
- (c) first and second filters defining a near-baseband passband spaced from DC by about an integer multiple of the channel spacing;
- (d) first and second mixers, responsive to an amplified signal from the RF amplifier and an approximately quadrature local oscillator signal from the local oscillator, frequency translat[e]ing to the near-baseband passband (1) an upper

high frequency spectrum of interest from above the frequency of the local oscillator signal, and (2) a lower high frequency spectrum of interest from below the frequency of the local oscillator signal; and

(e) a selector structured to select one of the high frequency spectra of interest.

Claim 40 (canceled)

Claim 41 (previously presented) The apparatus of claim 39 wherein the near-baseband passband is sized to fit one channel spacing.

Claim 42-43 (canceled)

Claim 44 (previously presented) The apparatus of claim 39 wherein the spacing of the lower edge of the near-baseband passband from DC is about twice the channel spacing.

Claim 45 (canceled)

Claim 46 (original) The apparatus of claim 39 wherein the filters include continuous-time switched-capacitor circuitry.

Claim 47 (previously presented) The apparatus of claim 39 wherein the near-baseband passband is spaced from DC by about the channel spacing and is about an integer multiple of the channel spacing wide.

Claim 48 (canceled)

Claim 49 (previously presented) The apparatus of claim 47 wherein the spacing of the lower edge of the near-baseband passband from DC is about twice the channel spacing.

Claim 50 (original) The apparatus of claim 39 wherein the filters include continuous-time highpass and lowpass filters.

Claim 51 (original) The apparatus of claim 50 wherein the filters further include continuous-time switched-capacitor circuitry.

Claim 52 (previously presented) The apparatus of claim 39 further comprising discrete-time filters.

Claim 53 (previously presented) The method of claim 26 further comprising providing spectrum coverage within the upper high frequency spectrum of interest at one time and providing spectrum coverage within the lower high frequency spectrum of interest at a different time.

Claims 54-58 (canceled)

Claim 59 (currently amended) ~~The A tuning method of claim 54 further comprising:~~

(a) mixing a channel of interest from a channelized spectrum with a first local oscillator signal;

(b) filtering the mixed signal to define a near-baseband passband that is (1) sized to fit one channel spacing, and (2) has a lower edge spaced from DC by about an integer multiple of the channel spacing or a half-channel-spacing displaced from about an integer multiple of the channel spacing;

(c) splitting the incoming signal into two signal paths; and

(d) quadrature mixing the split incoming signal with the first local oscillator signal and a second local oscillator signal approximately in quadrature with the first local oscillator signal.

Claim 60 (previously presented) The method of claim 59 further comprising performing digital image rejection.

Claim 61 (previously presented) The method of claim 59 further comprising performing the image rejection after the quadrature mixing.

Claim 62 (canceled)

Claim 63 (previously presented) The method of claim 61 wherein the lower edge of the near-baseband passband is spaced from DC by about twice the channel spacing.

Claim 64 (canceled)

Claim 65 (currently amended) A method for tuning a signal channel of interest, comprising:

- (a) receiving a channel of interest from a channelized spectrum having a predetermined channel spacing, wherein the channel of interest has a predetermined maximum bandwidth less than the channel spacing;
- (b) producing I and Q signals in approximate quadrature relation by mixing the channel with an approximately quadrature local oscillator signal having a first frequency that is an integer multiple of the channel spacing; and
- (c) defining a near-baseband passband whose lower edge is spaced from DC by at least about the channel spacing, by passband filtering the I and Q signals.

Claims 66-68 (canceled)

Claim 69 (previously presented) The method of claim 65 further comprising coarse-tuning the local oscillator signal by one local oscillator step from the first frequency to a second frequency an integral number of channel spacings from the first frequency.

Claim 70 (previously presented) The method of claim 69 wherein the second frequency is two channel spacings from the first frequency.

Claims 71-72 (canceled)

Claim 73 (previously presented) The method of claim 65 wherein passband filtering the I and Q signals comprises filtering the signals in continuous-time using switched-capacitor circuitry.

Claim 74 (previously presented) A method for tuning a channel of interest, comprising:

- (a) receiving a channel of interest from a channelized spectrum having a predetermined channel spacing, wherein the channel of interest has a predetermined maximum bandwidth less than the channel spacing;
- (b) producing I and Q signals in approximate quadrature relation by mixing the channel of interest with an approximately quadrature local oscillator signal having a first frequency that is one-half of a channel spacing displaced from an integer multiple of the channel spacing; and
- (c) defining a near-baseband passband whose lower edge is spaced from DC by an integer multiple of the channel spacing, by passband filtering the I and Q signals.

Claims 75-76 (canceled)

Claim 77 (previously presented) The method of claim 74 further comprising coarse-tuning the local oscillator signal by one local oscillator step from the first frequency to a second frequency an integral number of channel spacings from the first frequency.

Claim 78 (previously presented) The method of claim 77 wherein the second frequency is two channel spacings from the first frequency.

Claims 79-80 (canceled)

Claim 81 (previously presented) The method of claim 74 wherein passband filtering the I and Q signals comprises filtering the signals in continuous-time using switched-capacitor circuitry.

Claim 82 (previously presented) The apparatus of claim 19 further comprising a digital circuit that substantially rejects the image.

Claims 83-84 (canceled)

Claim 85 (currently amended) The A method for tuning a channel from a channelized spectrum having predetermined channel spacing, the method of claim 83 further comprising:

- (a) mixing a channel of interest with a first local oscillator signal;
- (b) wherein the first local oscillator signal has a first frequency that (1) is an integer multiple of the channel spacing and (2) is selected to frequency translate the channel of interest to within a near-baseband passband whose lower edge is spaced from DC by at least about the channel spacing; and

(c) the method further comprises mixing the channel of interest with a second local oscillator signal having the first frequency and being approximately in quadrature with the first local oscillator signal.

Claims 86-87 (canceled)

Claim 88 (currently amended) The A method for tuning a channel from a channelized spectrum having predetermined channel spacing, the method of claim 83 comprising:

- (a) mixing a channel of interest with a first local oscillator signal;
- (b) wherein[.] the first local oscillator signal has a first frequency that (1) is an integer multiple of the channel spacing and (2) is selected to frequency translate the channel of interest to within a near-baseband passband whose lower edge is spaced from DC by at least about the channel spacing;
- (a) (c) the channel of interest lies within one of an upper high frequency spectrum of interest and a lower high frequency spectrum of interest; and
- (b) (d) the method further comprises providing spectrum coverage within one of the high frequency spectra of interest and not the other.

Claim 89 (previously presented) The method of claim 88 further comprising switching between:

- (a) providing spectrum coverage within the lower high frequency spectrum of interest and not the upper high frequency spectrum of interest; and

(b) providing spectrum coverage within the upper high frequency spectrum of interest and not the lower high frequency spectrum of interest.

Claims 90-135 (canceled)

Claim 136 (previously presented) A tuning method comprising:

- (a) receiving a channel of interest from a channelized spectrum having a predetermined channel spacing;
- (b) producing I and Q signals in approximate quadrature relation by mixing the channel of interest with an approximately quadrature local oscillator signal having a frequency that is one of a set of local oscillator frequencies; and
- (c) passband filtering the I and Q signals to define a passband whose lower edge is situated near baseband but spaced from DC by at least about the channel spacing.

Claim 137 (previously presented) The method of claim 136 wherein the channel of interest has a predetermined maximum bandwidth less than the channel spacing.

Claim 138 (previously presented) The method of claim 136 wherein filtering to define the passband comprises defining a passband whose center frequency has a spacing from DC that differs from an integer multiple of channel spacing or a half-channel displaced from an integer multiple of channel spacing by a frequency adjustment.

Claim 139 (previously presented) The method of claim 138 wherein the frequency adjustment is about half of the channel spacing.

Claim 140 (previously presented) The method of claim 138 wherein filtering to define the passband comprises defining a passband that is approximately a channel spacing wide.

Claim 141 (previously presented) The method of claim 140 wherein defining a passband comprises defining a passband that is wider than a channel spacing by a frequency adjustment.

Claim 142 (previously presented) The method of claim 138 wherein the frequency adjustment is predetermined.

Claim 143 (previously presented) The method of claim 138 wherein the frequency adjustment is static.

Claim 144 (previously presented) The method of claim 138 wherein defining a passband comprises defining a passband by extending the upper and lower edges of the passband by frequency adjustments.

Claim 145 (previously presented) The method of claim 144 wherein the frequency adjustments are not equal.

Claim 146 (previously presented) The method of claim 136 wherein filtering to define the passband comprises determining the edges of the passband by the center frequency of the channel of interest contained in the I and Q signals.

Claim 147 (previously presented) The method of claim 146 wherein determining the edges of the passband comprises making the passband wider than the width of the channel of interest by a predetermined frequency adjustment.

Claim 148 (previously presented) The method of claim 147 wherein making the passband wider than the width of the channel of interest is done by adjusting both the upper and lower edges of the passband by predetermined frequency adjustments.

Claim 149 (previously presented) The method of claim 145 wherein the predetermined frequency adjustments are not equal.

Claim 150 (previously presented) The method of claim 145 wherein determining the edges of the passband further comprises separating the edges of the passband by approximately the maximum bandwidth of the channel of interest.

Claim 151 (previously presented) The method of claim 150 wherein separating the edges of the passband comprises making the passband wider than the spacing of the channel of interest by a predetermined frequency adjustment.

Claim 152 (previously presented) The method of claim 136 wherein the lower edge of the near-baseband passband is spaced from DC by about the channel spacing.

Claim 153 (previously presented) The method of claim 136 wherein the lower edge of the passband is spaced from DC by about 1.5 times the channel spacing.

Claim 154 (previously presented) The method of claim 136 wherein the lower edge of the passband is spaced from DC by about twice the channel spacing.

Claim 155 (previously presented) The method of claim 136 wherein the lower edge of the passband is spaced from DC by about 2.5 times the channel spacing.

Claims 156-158 (canceled)